System of Opportunity: Permeable Education and Training in Colorado

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Report

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System of Opportunity

Permeable education and training in Colorado

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Introduction

Youth apprenticeship is a major topic globally and in the United States[1], and Colorado's current pilot youth apprenticeships—implemented by CareerWise Colorado[2] in partnership with companies, schools, state leaders, and philanthropic partners—is the most compelling American initiative in this area. The two pilot cohorts already underway are anecdotally very successful, with students and companies reaping rewards from participation. The initiative is entering a phase where youth apprenticeship seems reasonable as a statewide mainstream option. This brings new challenges and opportunities that revolve around fitting the program into a permeable education system, ensuring its value for all stakeholders, and solidifying industry ownership.

Colorado has some history with apprenticeship, mainly Registered Apprenticeships run through the Department of Labor. However, Registered Apprenticeship is a labor market integration program that serves adults and is not part of the education system. Registered Apprenticeships are typically company-specific rather than designed at the occupation level, making completers' credentials less portable. Colorado's current youth apprenticeship initiative is a radical step toward a permeable education system that enables multiple pathways to good careers, thriving industry, and empowered individuals.

Colorado's youth apprenticeship initiative is an exciting step in the direction of a very compelling global education and training system. However, it still has hurdles to overcome. Most importantly, apprenticeship alone is only the workplace training part of the program. The whole program taken together is an **education and training** program, referred to internationally as vocational education and training (VET). When the program is integrated under one name, curriculum, and qualification, it is more valuable, more transparent, and better positioned in a **permeable education system**.

A permeable education system is key to overcoming some of the current problems created by having one main educational route through high school to college. This narrow definition of a successful educational career has created a culture of "college for all" among well-meaning education leaders and providers, but Colorado has not been able to send every student on to college completion[3]. It is time to try something new, and VET offers a promising chance for students to engage with diverse skillsets and learning styles. When VET is part of a permeable education system, it offers participants entry tickets into successful careers, lifelong learning, and higher education if they want it.

A Note on the Word "Vocational"

The word "vocational" has a problematic history in the United States[4]. It recalls segregation, a second-class education for other people's children[5], and dead ends in low-paying blue-collar jobs.

However, VET is the internationally accepted term for formal, secondary-level education and training programs. Occasionally Technical and Vocational Education and Training (TVET) is used[6], but that has the same issue. Globally, VET is a deeply well researched policy tool for improving equity and professional success in young people[7]. VET is defined by the OECD as a formal program leading to a national (in this case state) qualification. At least 25% of the content must be oriented to labor market preparation in a specific occupation. For dual VET, which combines school and the workplace, participants must spend at least 25% but usually 50% of their time in the workplace[8].

Colorado should come up with its own name for the program, but this report uses VET. This report's recommendations for the design of VET programs and the education system in which they should be embedded are specifically designed to ensure equity, opportunity, and a no-dead-ends ethic that is directly contrary to the history of the word "vocational" in American education. Dual (school- and work-based) VET is the gateway to living wages, further education and training opportunities, and all types of careers. Decades of research on international VET systems shows that VET students can change careers, have good wages, and even have higher returns on their educational investments than university graduates[9].

Definitions

Terminology is a challenging part of discussing education. These definitions describe what specific terms mean in this document.

Vocational Education and Training (VET)

General term for upper-secondary level dual vocational education and training programs in any context. These programs prepare 15-19-year-old individuals for employment and further education and training.

Dual VET

Subtype of VET programs that combine theoretical classroom education and practical workplace training guided by an occupational curriculum. According to the OECD, vocational education and training programs only qualify as dual when participants spend 25% or more of their time in the workplace[7].

Colorado's current youth apprenticeship program

A specific program currently in its pilot phase statewide. CareerWise Colorado is the main implementing actor for this program, in which approximately 250 students participate as part of two cohorts. In the future, Colorado VET may be the state's apprenticeship program, part of the statewide permeable education system.

Qualification

According to the International Labor Organization, "A package of standards or units judged to be worthy of formal recognition in a certificate."[10] Qualification is the general term for formal degrees, diplomas, and other credentials.

System vs. Program

An education system comprises individual programs. Every program in an education system is formal, leads to a formal qualification (for example with a degree or diploma), and has clear entry conditions and qualification requirements. Individual qualifications align to some framework of levels and types, most commonly the ISCED levels used by the OECD. Education systems also include capacity measures like career guidance, a legal framework defining accreditation processes and stakeholders' roles, and clear procedures for updating, adding, and removing programs.

Professional Education and Training (PET)

Tertiary-level formal programs that transmit advanced competencies to enable professional advancement and lifelong learning. Industry bodies organize formal PET, recognized or accredited with specific qualification standards. Although they are not usually referred to as PET, medical and legal education, training, and exams like the Bar fit the definition of PET[6.], PET programs are not common in Colorado at the moment—mostly because non-college post-secondary programs are generally informal.

After three years of intensive development, building the program, and piloting the first cohorts, Colorado's apprenticeship initiative is moving into a formalization and expansion phase. This report looks forward to the next ten-plus years, which requires more organization and long-term planning. For this phase, the initiative needs a clear **master plan** to facilitate partnerships and streamline progress. This should include an organizational structure, critical path with a timeline of individual projects, and dynamic stakeholder roles.

In this report, we focus on Colorado and use examples and stories from Switzerland (in boxes). Switzerland is a useful example because that country has a similar liberal market economic structure, a system built on its recent history of successful reforms, and an exceptional permeable education system. Switzerland is also similar in population size to Colorado and has a similar business landscape dominated by small and medium enterprises (SMEs). The Swiss federal Confederation can stand in for Colorado's state government, at least for education and training purposes. Switzerland is not Colorado and none of its policies, materials, or approaches fit the state exactly. Instead, they can be examples, illustrations, and ideas for Colorado to develop its own system.

An Integrated VET Program

Apprenticeship is a way of learning. The participant learns in a workplace setting from more experienced "master" trainers. Apprenticeship is the workplace learning part of upper-secondary VET programs around the world. These are formal programs that are part of the education system and lead to nationally recognized qualifications. Registered Apprenticeship, run by the Department of Labor, essentially follows the workplace-only model.

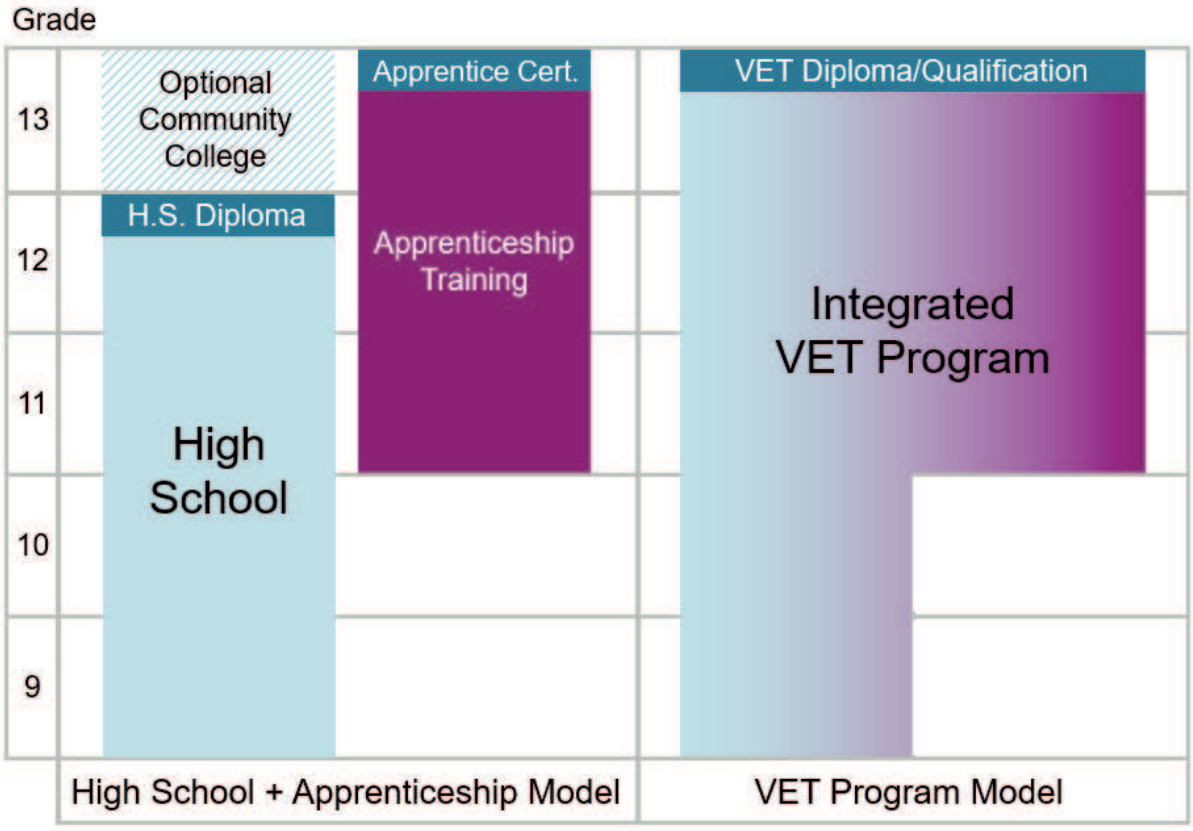
At the moment, Colorado's pilot apprenticeships have a separate curriculum from the high school education component. However, the approach is one of the first that lets students to pursue both school and workplace learning simultaneously. This is a strong step towards a program that unifies education and training.

An integrated VET program includes both general education and occupation-specific training under one curriculum and leading to one qualification that recognizes both education and training. For these dual VET programs combine school and workplace learning environments, so the training part of the curriculum happens in a company through and apprenticeship format. In contrast, "school-based" VET programs use classroom training instead of apprenticeship, and are much less beneficial for students' later success[11].

Colorado's current workplace learning initiative accommodates the timeline and requirements of high school. The program can continue to do that—introducing apprenticeship in 11th grade and continuing through a 13th year—but under one unified curriculum. The curriculum would cover all competencies learned at work and in school, based on general education requirements and the needs of the training occupation. Figure 1 shows the difference between apprenticeship alongside education and an integrated VET program with the same timeline.

The two models are not equivalent. Separating the education and training parts into separate qualifications and programs—even aligned programs—devalues both. Unifying both education and training under a single curriculum makes teaching and training more efficient and effective, and allows the final qualification to more accurately reflect participants' knowledge and skills. Furthermore, it facilitates students' journey into the work, continued professional education and training, or further education.

Figure 1: High school with apprenticeship compared to integrated VET



The current program is the right way to move towards an integrated future program, but the process of integration takes time. Adding apprenticeship alongside high school is Colorado's first way of including workplace training and occupational curricula in its education system. Making the program a VET program in the future is a prerequisite for permeability, value, and true career readiness.

The pilot proves the concept that companies are willing to train and to coordinate their efforts. To develop that pilot into a formal program that can be part of a system, it needs an integrated curriculum that covers all learning activities. To be a formal program, it needs its own qualification that signifies achievement of all its requirements.

Recommendation 1

Over time, integrate education and training into one VET program by designing a joint curriculum.

A Permeable Education System

Colorado's future VET program should be embedded in a permeable education system comprising programs of many levels and types. In addition to the individual programs, the system includes transition mechanisms, intermediary and facilitation capacities, and guidance and support services for students. It is governed by a legislative framework that describes roles, responsibilities, and resources. The system is the ecosystem that makes each program valuable individually and enables individuals to follow productive and satisfying lifelong learning pathways.

The most common way of describing education levels is to use the International Standard Classification of Education[11] (ISCED). ISCED's coding of levels runs from zero to nine, as summarized in Table 1. VET is usually levels three and four.

Table 1: ISCED Levels	
0	Early childhood education
1	Primary education
2	Lower secondary education
3	Upper secondary education
4	Post-secondary non-tertiary education
5	Short-cycle tertiary education
6	Bachelor's or equivalent level
7	Master's or equivalent level
8	Doctoral or equivalent level
9	Not elsewhere classified

Professional education and training (PET), or non-university further education and training, can be available at levels five through eight. Formal PET is not common in Colorado at this point, but this report strongly advocates for developing PET to provide non-college high-level options, enable permeability, and create opportunities for lifelong learning.

A fully permeable education system for Colorado, illustrated in Figure 2, would differentiate between traditional high school and the beginning of the Colorado VET at upper secondary ISCED level three, with VET extending to level four. This is similar to students who earn Advanced Placement credit, do concurrent enrollment, or pursue International Baccalaureate programs—their knowledge goes beyond the standard high school level.

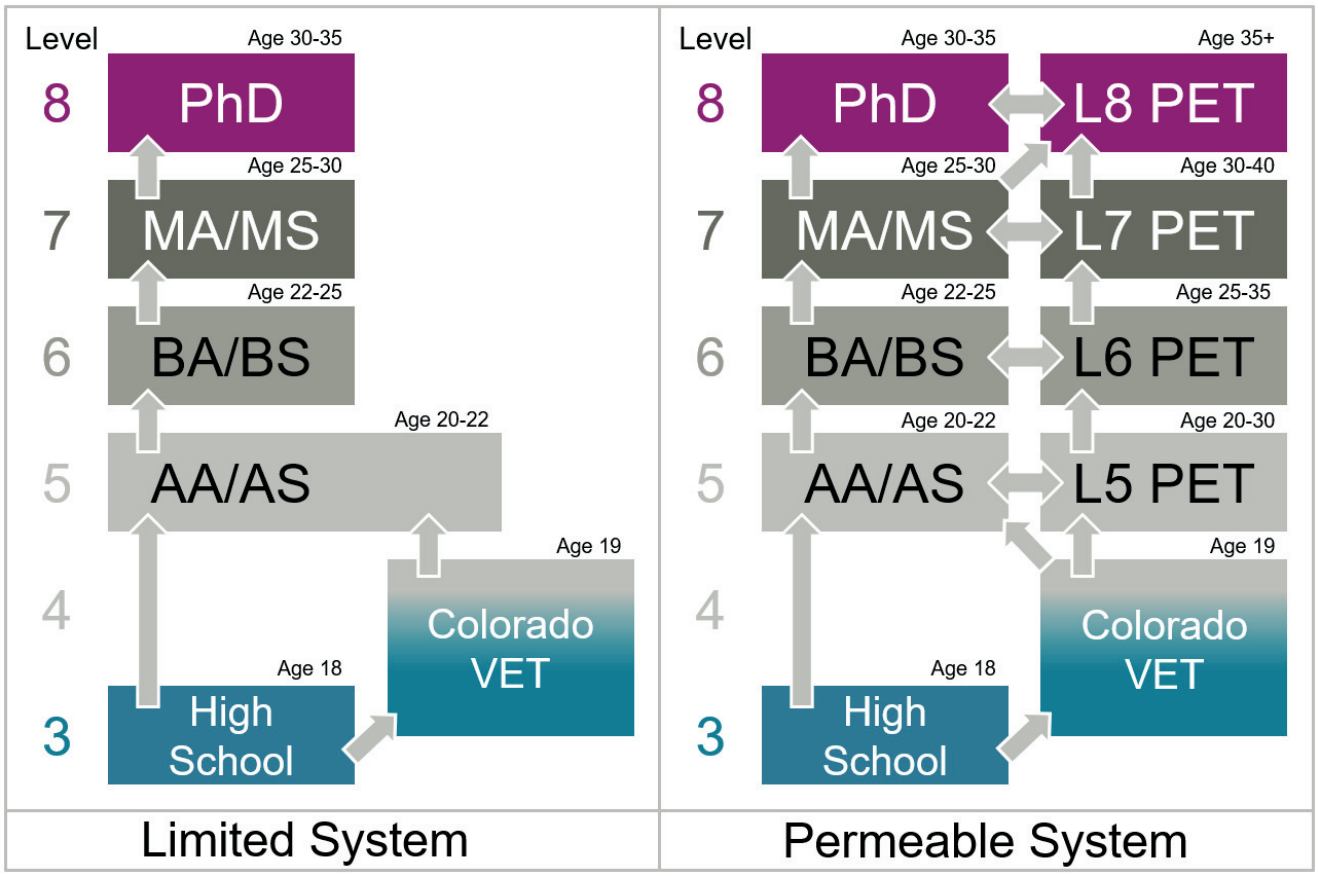
PET Exam Example: The Bar Exam

The Bar Exam is a good example of a high-level PET-style exam that already exists in the US. It typically requires a law degree (level seven) as its entry condition and passing the test as its qualification standard. The Bar Exam is industry-led by the American Bar Association has clear accreditation conditions and grants passing participants the right to carry out an occupation.

Figure 2 shows Colorado's current formal education system and a model future system. On the left side of each image are the ISCED levels from three to eight. The academic side already covers all of those levels. For a fully permeable system, Colorado needs VET as well as numerous professional education and training (PET) programs at levels five to eight—otherwise, any improvement in VET is just another path into the existing university pathway.

Figure 2 also includes the approximate ages of program participants upon graduation under typical circumstances. In the current system, for example, individuals usually earn a Bachelor's degree around age 22-25. In the model system, the age ranges for PET programs are wider and generally a bit higher. PET enables lifelong learning and career progression, rather than the learn-then-work model more commonly seen in academia.

Figure 2: Colorado's current education system compared to a model system



In the model system, there are PET programs from levels five through eight, which represent different competency and complexity levels, defined in cooperation with industry to ensure labor market relevance. The level of a PET program is determined by its entry conditions and qualification standards, validated by whatever authority has power to accredit or formalize PET programs. Level-five PET, usually programs that help individuals move from entry-level positions up the career ladder, typically requires VET and relevant work experience for access. Programs at the highest levels may require certification from levels seven or eight to enter, along with some amount of relevant work experience.

The next step for Colorado VET should be to build a true system that is permeable, has value for participants, and engages industry partnership.

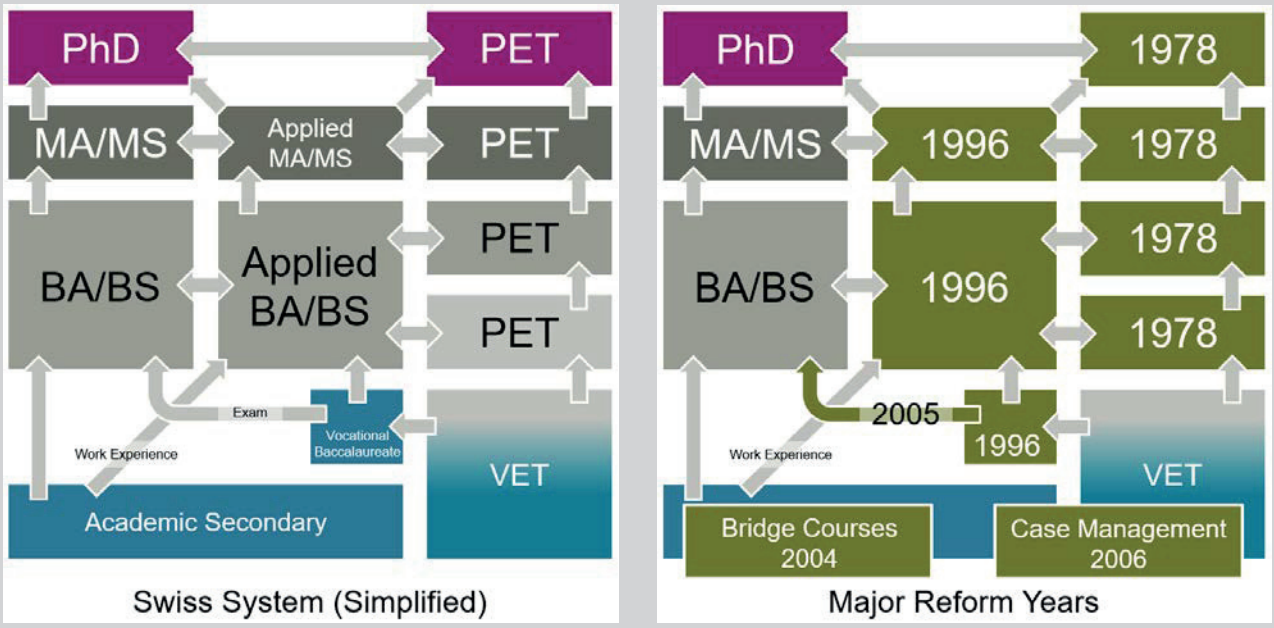
Recommendation 2

Build Colorado VET as part of a formal, permeable education system with industry partnership.

Building permeability: Switzerland 1978-2015

Switzerland radically improved the permeability of its education system in three waves of reform from 1978-2006. These reforms were spurred because the popularity of VET was decreasing as it became less attractive compared to academic secondary school—partly because of an international drive towards university for every student. The solution was permeability, so that individuals could go from any starting point to any terminal degree. This eliminated the opportunity cost of choosing VET, so students can prefer practical contexts, learning outside the classroom, or going straight to work without risking their futures.

Figure 3: Simplified Swiss System at present and with reform years



Due to the reforms, permeability increased in both access and opportunity. The 1978 and 1996 reforms mainly increased opportunities by adding the Federal Vocational Baccalaureate, formalizing PET programs, and adding Universities of Applied Sciences. A new VPET Act and a constitutional change also moved all occupations—mainly healthcare, social work, and the arts—under the same VET and PET framework. The later reforms from 2004-2006 were more focused on access, adding bridge courses, increased career guidance, case management for struggling individuals, and the University Aptitude Test.

Figure 4: Upper secondary attainment 2004-2012 by program

Image credit: SERI

The final major reform was that in 2004, VET curricula were unified from separate work and school curricula to one integrated plan. As a result of those reforms and others, the upper-secondary attainment rate went up approximately 10% over the period from 2004 to 2012, from 86.6% to 94.7%. This improvement was driven by increased attainment in VET specifically—VET is only attractive if there are progression routes for all graduates.

1. Permeability

Everyone passes through the education system, and what that system offers should serve every future path and an individual's full lifespan. With only an academic pathway, there are no formal qualifications for those who prefer to remain in the labor market while climbing or re-orienting their individual career ladders. Therefore, the education system needs to offer multiple alternative options as well as opportunities to move among those options. This characteristic is permeability. Permeability is two-dimensional, covering both **access and opportunity**. Only systems with both dimensions are fully permeable.

Access means that individuals can enter programs based on clear entry conditions and from various starting points. For example, American students can enter four-year universities directly from high school, as transfer students from community colleges, or later in life after working for some time. All students are eligible to earn undifferentiated bachelor's degrees regardless of their starting points.

Opportunity means that there are multiple formal pathways through the education system, covering diverse levels and types of skills and knowledge. For example, VET at the upper-secondary level, followed by PET at the post-secondary and tertiary levels.

Why permeability?

Permeability serves three main functions: equity, attractiveness, and flexibility over an individual's full lifetime. A permeable system has no dead ends.

Permeable education systems are more equitable because they acknowledge different types of talent, reject a one-size-fits-all approach to education, and reduces mismatch. An education system with only one pathway to success and only one point of entry for every program would be the least equitable system possible, especially if the single pathway were traditionally associated with high social capital. The opposite is an education system where any starting program can lead to any terminal program at any point in time, and every program has clear value not just socially but in terms of increased earnings and better jobs. If a young person struggles or does not want to be in a classroom early on, they have ample opportunity to adjust. Clearer access conditions and sufficiently diverse opportunities are foundational for equity.

Attractiveness is about social status and the returns to investing in a given program. Social status is largely an outcome of programs' quality and the system's permeability—a program leading to a dead end cannot have high status. We will discuss the reasons individuals and companies choose to invest time, effort, and money in VET and PET in the next sections, but in short individuals must expect good career options. If choosing a VET program or academic education as a starting point locks individuals into their choice for life, both options are less attractive.

Finally, permeability enables flexibility not just for youth but also for lifelong learners. Dead-end, very firm-specific VET programs are high-risk for participants because they may end up locked into an unattractive, dying, or low-earning career. The Registered Apprenticeship is an example of a very firm-specific program, differing widely from VET in that regard. A dead-end program has no currency in the education system, and very little on the labor market. With permeability, individuals can always retool, upgrade, or change career pathways. This is especially critical as technological change make education and training a lifelong pursuit. The modern formal education system needs to serve all ages, not just children and youth earning their first formal diplomas.

Permeability in Colorado

Access is already a priority in Colorado, so bringing it up to the necessary level is more of a tweak than a radical change. As a starting point, tertiary education programs need to account for related VET in their entry criteria. For example, Swiss Universities require either the Academic Baccalaureate or VET plus Federal Vocational Baccalaureate—earned either during or after VET—and the University Aptitude Test. In contrast, Universities of Applied Sciences accept VET plus the Federal Vocational Baccalaureate. They will only take students with an Academic Baccalaureate if they have at least a year of work experience (see Figure 3) because labor market experience has its own value and cannot be substituted by simply adding more years of schooling.

Opportunity—formal education and training programs of diverse types and multiple level—is less developed in Colorado, for a number of reasons. The most critical reasons are that the current youth apprenticeship pilot does not have a standalone formal certification, and there are extremely limited PET options—none of which are part of a formal education system with clear levels.

Recommendation 2a

Increase permeability by improving access and especially opportunity.

Access: Account for VET in the entry requirements for tertiary programs and institutions in Colorado so that VET graduates have clear pathways to entry in any next step.

Opportunity: Create a formal, systemically embedded certification for Colorado VET

Opportunity: Begin developing a robust, formal PET sector.

2. Value

Value reflects **quality** and **currency.** A program is valuable to students when it has consistently high **quality**: the curriculum is relevant, pedagogical methods are appropriate, and graduates have met at least the program's minimum standards. For VET and PET, this means curricula are employer-led, frequently updated, and holistic so qualifications cover all learning locations and both practical and theoretical content; the program includes learning in both the workplace and the classroom; and there are exams to ensure students meet standards at a specified degree of proficiency.

Quality assurance is generally a responsibility allocated in the legislative framework covering VET and PET. Learning locations, pedagogical methods, and certification exam standards are all part of the program's basic structure. Curriculum updating procedures and quality assurance are part of the system surrounding and supporting individual programs. Curriculum updating needs to happen every few years and must be industry-led. Part of the quality assurance task is addressing specific concerns and complaints, but it also includes developing and using tools companies and schools can use to self-assess their own methods as well as students' progress.[12]

Example: The QualiCarte

The QualiCarte is a tool developed for Swiss companies to self-assess their training quality. It can also be used as a rubric for training quality in companies being inspected by Cantonal authorities. It is an implementation of Article 8 in the VPET Act, which states that all education and training providers are responsible for constantly improving quality. The QualiCarte is developed by education and industry actors together.

The QualiCarte has 28 indicators in five process categories:[13]

1. **Commitment**
    a. The criteria determining the expected profile of the apprentice are defined.
    b. Interviews are conducted with each of the applicants selected and other selection tools are used.
    c. Observation traineeships are organized and assessed.
    d. Applicants receive information on working conditions.
    e. The outcome of the selection procedure is conveyed in a clear manner to all applicants.
    f. The contractual clauses are explained to the applicants.
2. **Beginning of Training**
    a. Apprenticeship trainers are designated.
    b. On the first day of their apprenticeship training, learners receive a personal welcome and information.

c. Learners receive detailed information on the company's /institution's scope of activity.
d. Learners are informed about regulations concerning safety, health and hygiene at the workplace.
e. Learners are given their own workstation and the tools required to perform their tasks.
f. From the outset, learners are made aware of the importance of the VET ordinance and corresponding training plan (as well as the host company's apprenticeship training plan, the learner's individual training plan, etc.)

3. Training

a. During the trial period, learners regularly receive feedback from the apprenticeship trainer. At the end of the trial period, a training report is drafted and discussed with the learner.
b. The importance of apprenticeship training given to learners and other forms of support is clearly understood in the host company / institution.
c. The training plan and the other means to support apprenticeship training are applied consistently.
d. The apprenticeship trainer sets clear and measurable learning objectives. He /she checks progress to determine whether these objectives have been attained.
e. Work processes and methods are planned, demonstrated and explained.
f. The tasks completed by the learner are checked from a qualitative and quantitative viewpoint. The result is discussed with the learner.
g. The learner gradually becomes involved in the host company's activities and is given increasing autonomy.
h. The results obtained by the learner at the vocational school and branch training centers are monitored and discussed.
i. The apprenticeship trainer ensures that the learner receives personalized guidance and support.
j. Each semester, the apprenticeship trainer prepares a training report, which is then discussed with the learner as set forth in the VET ordinance for the given occupation.
k. The apprenticeship trainer gives the learner the opportunity to make critical remarks regarding apprenticeship training and takes these remarks into account where possible.

4. Commitments and Termination

a. If the learner encounters difficulties or if there is a risk that the apprenticeship contract will be terminated, the apprenticeship trainer immediately contacts – depending on the situation – the family, the competent authorities and /or vocational school.
b. All measures required to prepare the qualification procedure (organization and formalities) are taken in due course.
c. The arrangements for the departure of the learner are made in due course.
d. The apprenticeship trainer undergoes suitable continuing education and training on a regular basis.
e. The host company / institution provides the apprenticeship trainer with the requisite time, financial and material resources.

Currency is how useful the certification from an education program is for accessing further education and training or employment. A qualification should be a strong and convertible currency, meaning it is neither greatly inflated or deflated and that its worth is recognized across education institutions and types. Both permeability and consistent quality are prerequisites for currency—a program not in a permeable system or without a clear framework of quality standards cannot effectively help graduates access further opportunities. In addition, the program needs to be formal, named, and certified. For Colorado, that means a legislative framework that clearly sets out VET's role in a permeable education system, a name used statewide for the program, and a certification that represents mastery of the complete curriculum.

A legislative framework creates clear roles, responsibilities, standards, and procedures. By doing so, it gives schools and companies freedom to implement the program however works best for them while maintaining the critical goals of permeability and value. For example, companies are responsible for apprentices' learning particular skills and knowledge, but are free to apply company-specific timelines or structures.

Similarly, students must meet qualification standards but are free to spend time going deeper on their interests once the requirements are covered.

Example: Selected sections of the Swiss VPET Act

The Swiss VPET Act defines framework conditions for all types of vocational and professional education and training. Switzerland is similar in population size to Colorado, so it is reasonable to interpret the Confederation as the state level. The Act includes much more detail, but these selected elements address some of Colorado's immediate concerns:

Art. 12 Preparation for VET

"The Cantons shall take measures to prepare learners for upper-secondary level VET programmes if these learners have not reached the required level of academic achievement on completion of compulsory education."

Takeaway for Colorado: Individual school districts retain all rights and responsibilities related to preparing students for Colorado VET. This includes literacy, numeracy, and some degree of career counseling.

Art. 15 Subject matter

"VET programmes are intended to ensure the transfer and acquisition of upper secondary-level skills, knowledge and know-how (hereinafter referred to as competences) needed to carry out the tasks associated with an occupation, occupational field or field of activity."

Takeaway for Colorado: VET curricula are defined as occupations, not broad career pathways or narrow company-specific jobs.

Art. 16 VET segments, learning locations, responsibilities

"VET programmes shall include the following segments: a. workplace training segment (apprenticeship); b. classroom instruction segment comprising vocational and [foundational] subjects; c. additional training segment to complement the workplace training and classroom instruction segments if such additional training meets the needs of the occupational activity."

Takeaway for Colorado: The legislative framework sets out requirements like these for key program features. Things like workplace learning are non-negotiable program elements, even though different companies and/or schools are free to teach the required content in the way that suits them best.

Also note: The Act refers to the "workplace training segment" specifically as apprenticeship, not the entire program. The classroom and workplace parts together are VET, and therefore in line with the program's international peers and international criteria.

Art. 17 Types and duration of VET programmes

"VET programmes cover a period of…three or four years.

"…On completion of a three-year or four-year VET programme, learners shall take a final examination to obtain the Federal VET Diploma.

"Holders of the Federal VET Diploma who pass the FVB Examination on general education subjects are issued with the Federal Vocational Baccalaureate.

"Competences acquired through non-formal or informal learning may be validated through specific qualification procedures leading to issuance of a Federal VET Diploma."

Takeaway for Colorado: A key function of the legislative framework is to lay out exactly what credentials program participants earn. This example also includes a strategy for the recognition of prior learning, which can be added later to improve permeability.

Naming the program under its own integrated qualification is critical for currency. This enables statewide understanding among all participants and stakeholders so graduates can communicate their knowledge and skills clearly in any part of the state. Colorado VET is not a new version of CTE, because it is a dual workplace- and school-based program. It is not an internship—which lacks a curriculum and a theory

element—nor is it short-term job shadowing, company-specific training, or Registered Apprenticeship. Occupation-based workplace learning is new as a secondary-level program in Colorado, and it needs a new place in the system. The program's qualification must be transparently associated with ISCED level four (or similar) and linked to lifelong learning pathways in PET, further academic education, or both.

Recommendation 2b

Increase value by improving quality and currency.

Quality: Establish curriculum updating procedures to maintain relevance

Quality: Formalize that workplace learning is a required program element

Quality: Set and enforce minimum qualification standards (i.e. with exams)

Currency: Build a legislative framework to formalize VET in the permeable education system

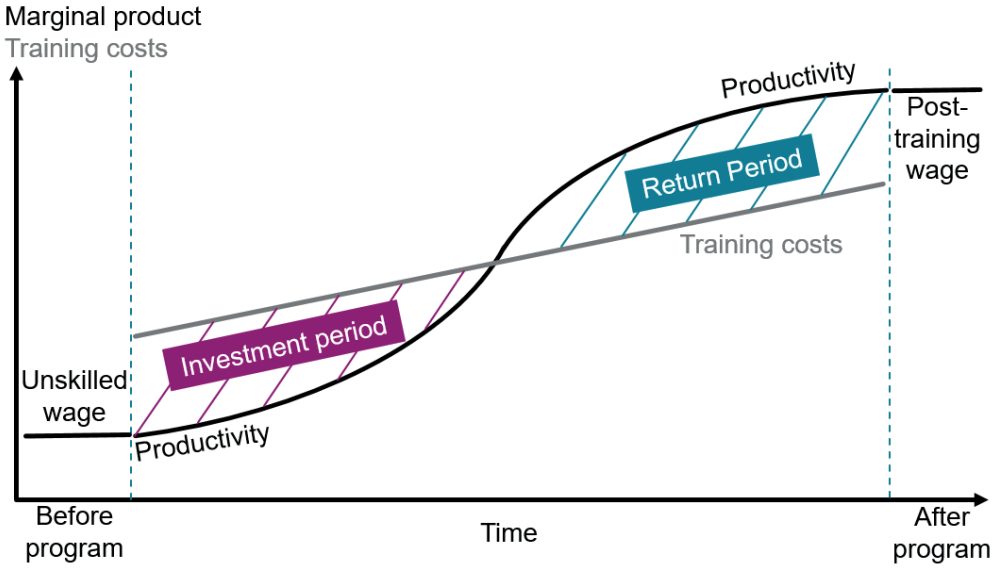
Currency: Name the program and give it its own specific certification

3. Industry Partnership

VET programs have to be owned by industry at least as much as they are by the education system. Employers have resources and information that educators do not have, like top-of-the-line equipment and knowledge of exact current and upcoming work requirements. Furthermore, workplace learning is the defining feature of successful VET[14], and obviously cannot happen without industry partnership.

Industry partnership contributes to filling out the education system, making it permeable, and giving value to individual qualifications. Industry actors offer workplace learning, drive VET curriculum development and updating, design PET programs—often in partnerships with PET colleges and potentially community colleges in Colorado—and advocate for their own interests in a way that balances out education voices and improves the system overall.

Figure 5: Company ROI during a VET program[15]



Workplace learning—the apprenticeship part of dual VET—enables participants to pick up much more knowledge and skills than they could do in the classroom. Soft skills like teamwork, responsibility, adaptability, and workplace behavior can be addressed in the classroom but are much more effectively learned in the workplace[16]. These skills are one of the fastest-growing hiring requirements for companies, along with the work experience that VET participants earn during apprenticeship[17]. With this alone, companies contribute to making VET more valuable than it otherwise would be.

Companies participate in VET when they earn returns on their training investments. They earn returns on training when the costs of training are less than apprentices' productivity and saved hiring costs[18]. Returns on training investments for employers are already part of the model for Colorado's pilot workplace learning program, as shown in Figure 5. Early observations imply that companies participating in the Colorado VET can indeed see break-even or positive returns to training by the end of the program. Formalizing key systemic elements supports success, lower costs for participating companies, and create better opportunities for students.

Attracting and keeping the right participants is key for companies' ROI, and the best strategies are value and permeability. Companies have a vested interest in supporting quality, currency, access, and opportunity throughout the education system. When students can trust that any starting point can lead to any endpoint, they are more willing to pursue an interesting VET program. Companies have a bigger pool of students to choose from, and are more likely to find a good match. In addition, formal certification for the VET program is good for companies because it encourages participants to stay through the 13th grade year and complete the program.

Apprentices' productivity and potential value as future employees are only valuable if their skills are relevant. Industry has much better knowledge of its own current and future skills needs, so industry is the natural leader for curriculum design and updating due to technological change. Colorado needs to develop many more curricula for new occupations in the near future, and industry should be clamoring to drive this process. Similarly, existing curricula need to be updated every few years and industry should be in the lead, determining what skills are still relevant and which should be dropped or added.

A robust apprenticeship job market is the ideal matching mechanism to help potential apprentices and training companies find each other. The current market is an excellent start. It should improve as more companies and students expand the pool of companies and VET candidates. Over time, companies should also learn what they value in an apprentice, whether that be grades, personality traits, interests, or something else. Whatever industry groups or intermediaries can do to facilitate these developments and speed them up will be advantageous to everyone in the system.

Finally, because companies want to find the right students and help create the right skills for their businesses, industry should find that it needs PET to offer career pathways within occupational fields. Workers need to update, improve, and increase their skills, and companies need people with high-quality skills in specific areas. PET enables individuals to acquire these skills formally and systematically. While VET is a cooperative effort between education and employers, PET is almost entirely industry-led. The government plays a facilitating role, and to do this Colorado needs a simple framework for proposing and validating PET programs so they are formal parts of the permeable education system.

Recommendation 2c

Develop the system to support industry partnership for VET and PET, specifically in the areas of supporting permeability and value, industry participation in curriculum development and updating, a robust apprenticeship marketplace, and PET development.

VET: Focus on helping companies understand why participating in curriculum development and updating—for a unified VET curriculum—increases their training ROI. CareerWise Colorado can support the development of industry organizations and strategies for facilitating participation, as well as hosting and leading negotiations.

PET: Create a legislative framework that lets industry actors easily create PET exams. Later, add PET programs as well.

Example: Selected sections of PET legislation

The Swiss VPET Act also defines requirements for PET. The following selected articles illustrate how Colorado can begin to build its PET programs.

Art. 26 Subject matter

"Holders of a Federal VET Diploma, a tertiary-level higher education qualification or an equivalent qualification may pursue professional education."

Takeaway for Colorado: Establish entry conditions that allow multiple pathways into PET programs and give weight to VET certifications.

Art. 27 Forms of professional education

"A tertiary-level professional qualification may be obtained: a. by preparing for a federal professional examination; b. by enrolling in a federally recognised study programme at a professional education institution."

Takeaway for Colorado: PET can be courses or simply exams. We recommend starting with exams as this is simpler for industry representatives and more flexible for potential education and training providers. Industry can simply establish the required competencies for an occupation at a given level. Providers, potentially existing colleges, can then offer preparatory courses of their own design or participate as exam proctors.

Art. 28 Federal professional examinations

"Suitable professional experience and expertise are required in order to take federal professional examinations."

Takeaway for Colorado: Each PET exam can set its own specific entry requirements, and these can prioritize experience when appropriate.

"The corresponding professional organisations shall establish admission requirements, course content, qualification procedures, qualifications and titles. They shall take into account completed courses of study. The regulations shall be subject to approval…[3]The Federal Council shall establish the requirements and procedures for obtaining approval."

Takeaway for Colorado: Define who can create new PET exams and how, putting industry clusters or organizations in the lead. While industry clusters are informal, consider allowing them to establish PET exams/programs when they represent a certain fraction of companies or employees in the related occupation.

Master Plan

Building a permeable education system in Colorado is underway but still requires a great deal of work and many diverse projects including several diverse stakeholder groups. With so much to manage, it is especially important to have a shared master plan that improves transparency for all key actors and keeps every project working towards the overall goal.

Building a permeable education system also involves different goals at different times. For the short- and medium term, the main goal is to get a permeable education system up and running sustainably in Colorado. In the long term, the initiative may add helping other states. Making the system serve Colorado with efficiency, effectiveness, and equity is the first priority upon with all other goals are built, but good planning can make sharing knowledge and tools much easier.

What is a master plan?

A master plan is a planning instrument that contains all of the relevant information for implementing a complex system change with various stakeholder groups like government, industry, and school leadership. It gives every stakeholder a transparent overview of the initiative's **organizational structure** including roles, responsibilities, deliverables, and monitoring. It organizes all actors and groups. It describes the intended implementation processes for every unit and sub-project through **key processes**. Finally, it highlights the **critical path** within the change process.

Basic path for developing a master plan

- List **all projects** necessary to implement a permeable education system in Colorado in the next decade
- Define the **critical path**—what needs to be done first—and determine which project activities are on that critical path
- Define necessary **working groups** and allocate projects to those working groups
- Check the **vertical coherence** of project work (i.e. how are similar projects in different geographies interlinked? What can be done in a parallel, and what is dependent?)

Recommendation 3

Create a master plan to organize the education system change process, make roles and responsibilities transparent, develop shared ownership, and prepare for key goals.

1. Organizational Structure

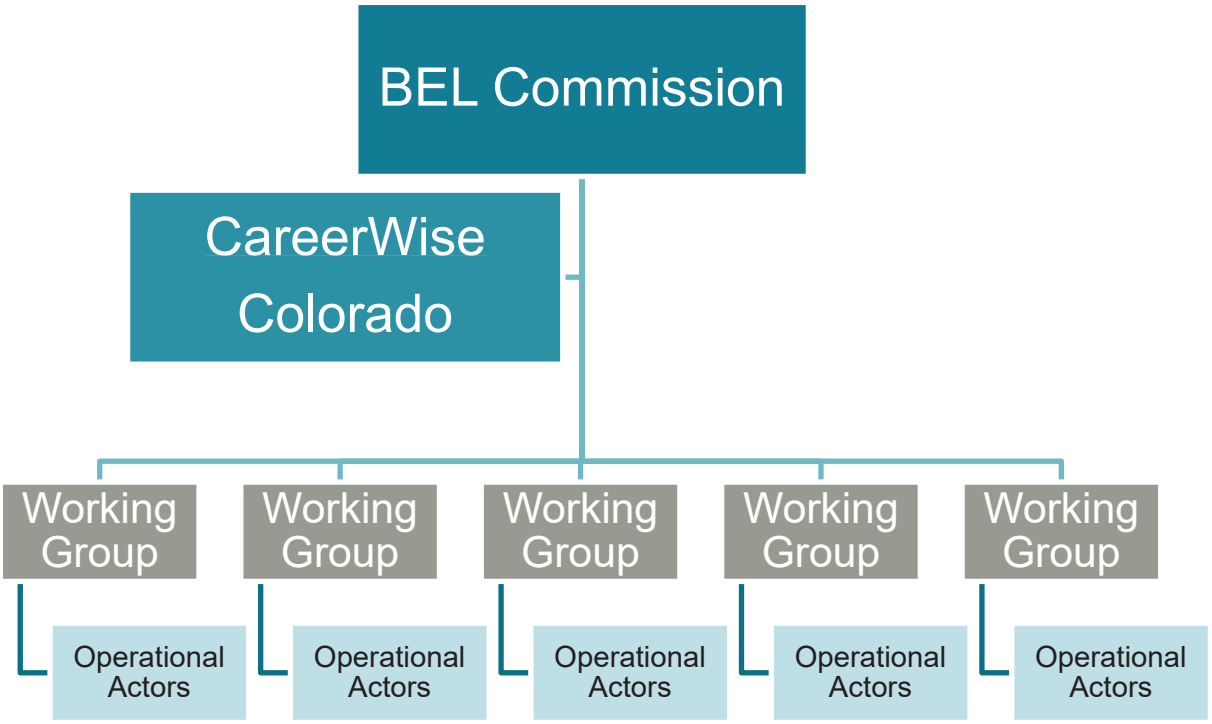
The master plan clarifies roles and responsibilities by laying out a leadership structure. This already exists to some extent in the current pilot initiative, and can be expanded to include more actors and stakeholders as the initiative expands.

The BEL Commission is the best candidate for a leadership body, given that it is industry-led and includes state-level leadership. It is probably worthwhile to add some representation from the education system to this group or its advisory bodies. CareerWise Colorado is the operational leader, and should continue to be a critical intermediary in the system at least until the entire systemic change is legally established.

Assign key sub-projects to dedicated working groups, made up of stakeholder and operational leaders. These working groups should include all affected groups to ensure dialogue and *shared ownership*. Working

groups should lead, support, and advise operational actors like individual school leaders or in-company training managers. They can develop and codify best practices to help new actors plug into the system.

Figure 6: Organizational structure



Recommendation 3a

Formalize the initiative's organization structure to include all stakeholders, clarify roles and responsibilities, and enable efficient operation.

2. Key Processes

Each key process should be monitored by a dedicated working group. The operational leader, CareerWise Colorado, can monitor the structure and status of each working group. Initiative leadership monitors the status of each working group, for example using a stoplight system. The group should also report its risks and challenges, its opportunities, and its related projects—either where it is in the critical path of another project, or where another project is in its critical path.

Working Group Designation Features

- Purpose/Key Process
- Manager
- Members
- Responsibilities
- Tasks
- Milestones
- Risks and mitigation strategies
- Deliverables
- Reporting and communication expectations

Critical Path Identification

- Which of this group's tasks, responsibilities, and deliverables (if any) are part of the overall initiative's critical path?
- Which of this group's tasks and responsibilities, and deliverables (if any) are part of another group's critical path?
- What is this group's internal critical path?
- What tasks, responsibilities, or deliverables from other groups are part of this group's critical path?

Research & Data Processes

The goal of a permeable education system is that participants are prepared to successfully find good jobs, pursue further education and/or training, and contribute to a society they are empowered to shape. Academic education is usually measured on how well it prepares graduates for further education, contribution to society, and personal empowerment. However, in a mostly academic system there are usually not many success metrics focused on employment, job quality, skills match (or mismatch), and other employment outcomes. Since moving to a permeable education system broadens the goals of the system, its definitions of success and metrics for monitoring and evaluation need to adapt.

Research and data are part of the critical path for all working groups and projects. Transparency brings diverse stakeholders together. Most of the big questions and problems can be addressed empirically, so working groups and strategic leaders can make decisions based on evidence, not instinct.

Colorado education institutions are currently evaluated on criteria that do not match up entirely with new goals. High schools report students' seat time and graduates' college entry as part of a system of metrics focused almost entirely on the college-for-all ethos. Universities are ranked based on applicants' test scores and grades, making it politically difficult to accept non-traditional students. Higher education institutions are funded and evaluated based on degree completers, which might undermine their willingness to participate

Example: The first company ROI study in Switzerland

Swiss companies have been training formally since the early part of the 1900s, but the first formal ROI study in Switzerland did not arrive until the end of that century. In 2003, Stefan Wolter, an economist at the University of Bern, answered the question of "why do companies train?" with a very detailed survey of companies that addressed every possible cost and benefit factor. He found that companies train when they make money by doing so[19].

The study had an immediate effect on companies' behavior and on policy. There was a debate in parliament at the time on whether companies should be subsidized for training. Ursula Renold, one of the authors of this report and then in charge of Vocational and Professional Education and Training, had Prof. Wolter's report on her desk when asked for her opinion on the potential subsidy by the Minister of Education. Based on the evidence that training companies were already making money—and its corollary that a subsidy would be a dead-weight loss for the government—the subsidy did not pass.

In companies, human resources managers already knew that training is good for their companies. However, new, international executives questioned a program they saw as philanthropy. The study gave apprenticeship believers the business-case language they needed to convince doubtful executives of apprenticeship's value.

The ROI study prevented Switzerland from spending unnecessary and potentially undermining subsidies on the VET system, and kept companies willing to participate. Ongoing ROI studies and some companies' new policy of monitoring ROI internally have increased the quality of training and of the system overall.

in PET. Education leaders in Colorado are well aware how these and similar metrics affect institutions' willingness and ability to participate. New metrics can capture progress towards attaining new goals set by Coloradoans today.

A **research program** based in Colorado is a key capacity building step that can help the state develop and maintain key metrics. Colorado has a number of universities with strong public policy programs, and any of these can host a new research program funded from the system. Existing research centers in Switzerland have decades of experience researching VET, permeable education systems, and youth labor markets. These centers at ETH Zurich, the University of Zurich, and the University of Bern can cooperate and offer their young-scholar development programs. Key projects in the short term should be ROI for companies, returns and effects for participants, and support for the legal landscape study. The advantage of basing the research program in a university is that it can be independent; evaluation and measurement have to come from outside the organizational structure of the master plan.

Recommendation 3b

Find a university partner—most likely in a School of Public Policy—to be the local, independent leader of research related to designing, monitoring, and evaluating Colorado's permeable education system. The following projects are part of the critical path:

Legal Framework Analysis

- Develop a full profile of key features for the permeable education system's legal framework
- Study the education and training legal landscape in Colorado to identify strengths, weaknesses, opportunities, and threats
- Use local Colorado expertise to identify the critical path
- *Related working group: Legal Issues*

Company ROI

- Short term: Case study of Pinnacol Assurance's first, second, and possibly third cohorts. Look for startup costs that diminish over cohorts as well as overall ROI.
- Long term: Once at least 300 companies in Colorado are participating, carry out a full formal ROI study
- *Related working group: Industry partnerships, Curriculum development*

Monitoring and Evaluation Framework

- Based on locally defined goals, develop a monitoring and evaluation framework that drives Colorado's permeable education system to the right ends and incentivizes the right behaviors.
- *Related working group: Research and data*

Implementation Research

- Implementation research: what gives rise to success and failure in Colorado? When are communities, companies, students, and schools ready or not ready to take on apprenticeship? What cooperation strategies, key features, or other resources drive success?
- *Related working group: State and national expansion*

Returns and Effects for Students

- Short term: Compile profiles of diverse apprentices' experiences.
- Longer term: What are the benefits and effects of participating in apprenticeship as opposed to traditional high school? What are the costs of *not* training?
- *Related working group: Education partnerships, Communication*

Legal Processes

A legislative framework is key for both value and permeability in the entire education system, and is a major part of the critical path for the entire initiative and for most sub-projects. As the pilot cohorts of apprentices progress through the program, they need a **formal, integrated certification**, clear roles and responsibilities for all actors, further options that include PET, and established entry conditions for further options that recognize VET and PET. While many of these problems can be started or partially solved with informal measures in the short run, the only **long-run option** for a permeable education system requires formality.

Education and training qualifications in Colorado are challenging. Different program types have different governing bodies, as in the case of high school falling under the Department of Education and the existing Registered Apprenticeship program for adults operating from the Department of Labor. Programs of the same type but at different levels can also exist in separate institutions, as in the case higher education. However, despite all of this Colorado has an opportunity to make it work. State leaders are invested in a permeable education system that effectively serves every Coloradoan. Businesses and schools see the impact pilot apprenticeships have had for their companies and the participating students and their parents.

The working group should identify short-term measures and items that are urgent enough to be solved by stopgap measures. For example, the first cohort of apprentices graduating in 2020 must have a formal credential, even if it is a temporary fix at the time of their completion. For long-term solutions, Colorado needs a landscape study to analyze the current legal framework against the critical features of the permeable education system's legal framework. Similar studies in other countries[20] have proven extremely helpful for this purpose.

Industry Partnerships

The main tasks related to industry partnership are recruiting companies to train, preparing industry to lead curriculum development and updating, supporting the development of industry or occupational clusters, and helping bring industry into program delivery through workplace learning.

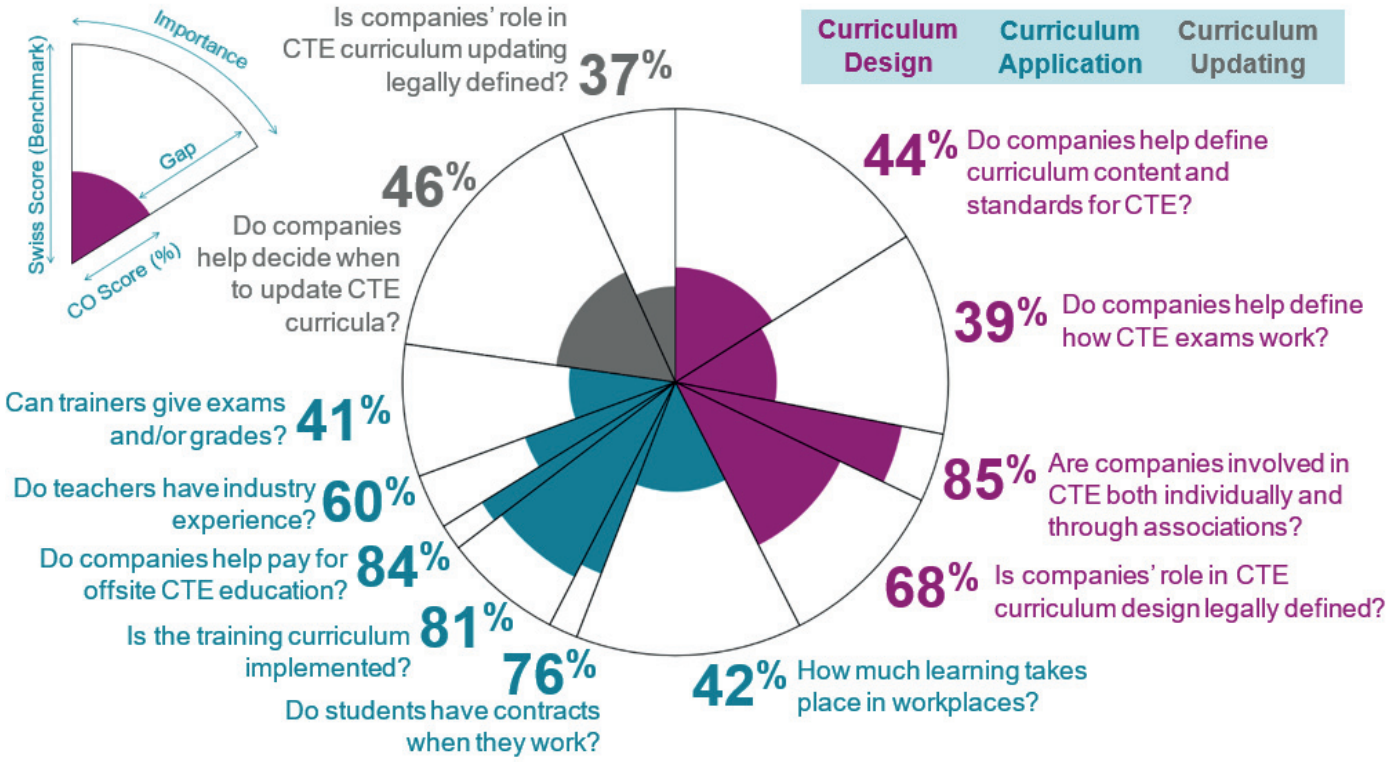
Figure 7 shows the main points of contact between employers and educators in VET program design, delivery, and updating. It shows evidence from a 2017 study on how well Colorado's existing high school CTE programs link education to employment[21]. That study used the KOF Education-Employment Linkage Index, a tool to compare international education and training systems despite the serious challenges that different institutions and labor markets present[22]. Higher scores on the index are correlated with better youth labor market outcomes overall, especially when accounting for job quality and skills matching[14, 22].

Overall linkage is low in Colorado. However, this is not because of lacking effort, but because effort is not going to the highest-impact places. In Figure 7, the most important industry partnership opportunities are the largest slices of the pie: determining qualification standards, learning in the workplace, and update decision timing.

Determining qualification standards is essentially curriculum design. The actual design process is another working group, but the industry partnerships working group should find ways to facilitate partnership on this process. Colorado's current score in this area is 44% of the benchmark, so there is plenty of room for improvement. The challenges in this process are getting companies to understand and advocate for their needs, bringing training companies to the table, bringing non-training companies to the table, and developing industry clusters to represent companies' interests and make the process more efficient.

The **learning place** process is workplace training. The apprenticeship part of VET happens in companies, with participants learning occupation-specific skills from skilled trainers. This working group needs to help recruit companies to train VET participants. The current youth apprenticeship initiative in Colorado is already a huge step forward from Colorado's pre-existing 42% score. One very effective strategy is encouraging companies who already host apprentices to communicate with others in their industry. When business leaders see their peers succeeding with apprenticeship, they are very likely to believe them. This is already very effectively in practice in Colorado, and should improve as the system grows.

Figure 7: Opportunities for partnership and existing cooperation in Colorado



The **update timing decision** is when a curriculum revision should happen. Industry has to be in control of this process because they are the first to see changes, developments, and course adjustments in their own industries. This is not an established process in the current pilot model and Colorado's CTE programs score only 46% of the benchmark, so this working group should create update-triggering processes relatively soon.

Another key task for this working group is overall facilitation of industry-education partnerships. Since the system is new and there is limited capacity for partnership at present, this working group can foster and support new cooperation strategies. One way to support industry collaboration is to convene and facilitate interactions. For example, the working group or CareerWise can provide the location, agenda, and organization of events where companies can participate together in curriculum development. If a group of companies choose to send a shared representative, they should be welcome.

The working group can also work with the Legal Issues group to make sure collaboration is encouraged by the legal framework. For example, PET programs can be established when they are proposed by a group of companies representing a certain proportion of the related industry. Over time, small representative actors can collect more members and advocate more effectively for many companies. Similarly, companies should see the efficiency gains of working together for specific purposes, making that behavior more popular over time.

In general, when this working group pursues new industry partners and invites existing ones to participate in the system, it should make an effort to represent the industry structure of Colorado. The state has mostly small and medium enterprises (SMEs), so these need a seat at the table alongside the largest employers. If they need different skills included occupational curricula, that is important information for graduates' future success. Rural areas are similarly important in Colorado. SMEs and rural areas have specific challenges, so the working group can develop strategies to support them like apprenticeship networks, additional human resources and administrative support from intermediaries like Chambers of Commerce, and purpose-specific cooperatives.

Examples: Support and collaboration for SMEs and rural areas

Libs: Large advanced manufacturing company ABB founded libs, a training center that teaches basic skills and safety standards for potentially dangerous or high-barrier-to-entry occupations. Now, libs is a collective of more than 80 companies that offers training services to its members—large and small. This helps small manufacturing companies save on training costs while providing the best learning experience to their apprentices.

Baselland Chamber of Commerce: The Canton of Baselland is more rural and has many SMEs. The Chamber of Commerce offers human resources support services, apprentice onboarding, and takes on the administrative load of training for its members as paid services. This lowers the burden of training for SMEs.

Sharing apprentices: When some companies are too small or specialized to offer every skill in the occupational curriculum, they share an apprentice with another company that can offer the necessary skills. This can range from a 50-50 split of all costs, responsibilities, and time to a situation where the apprentice only visits the second company for a matter of weeks, and the main training company pays for the help. For example ETH Zurich, which as a university is also a training site for apprentices trains 14 different occupations from laboratory technicians to administrators and building maintenance, offers the sharing service in a number of occupations. Its clients are both external companies and internal research labs who cannot train every competency their apprentices need to learn, so they have to team up with other entities to fulfill the requirements.

Education Partnerships

The most important part of student recruitment is that the program is a worthwhile option for students, meaning valuable and part of a permeable education system. So those goals are part of the critical path for student recruitment. The current pilot apprenticeship is anecdotally very successful and very worthwhile for participants, but that needs to be reliably and demonstrably the case.

Schools, counselors, teachers, parents, apprentices, and companies all play a role in recruiting students. Throughout the implementation of the new system and its future operations, students always need information on what to expect, what their post-apprenticeship options are, and what occupations are available. Part of this information should be evidence based on data from research and monitoring.

Lowering bureaucratic barriers to entry is another part of student recruiting. Current apprentices in Colorado are dealing with a very high load of scheduling issues, extra requirements from school or district authorities, and policies that force them to self-advocate beyond normal expectations. Therefore, we strongly recommend simplifying the program. The incremental solution is to help schools prepare students to apply for VET, advise on scheduling, and provide recommendations or examples of best practices. A more radical approach, possible once a critical mass of students pursues VET, would be for schools to specially schedule full classes of apprentices so young people can form cohorts, learn from their peers, and access simplified scheduling and services.

Career counselors may emerge as a specialized role, especially if career guidance becomes distinct from the other responsibilities of school counselors like emotional and behavioral support or scheduling. This is a political issue and one that Colorado's education leaders and school counselors can decide on their own. The incremental option is for CareerWise to provide extensive materials and training to counselors. Another option that might come up in the long term would be to separate career guidance into a dedicated office where students and adults can go for information on careers, career pathways, and lifelong learning opportunities throughout the permeable education system.

Occupational Curriculum Development and Updating

Curriculum development and updating for new and existing occupations is an ongoing process that should continue to exist in the mature system. The VET curriculum allocates general education and occupational competencies along a multi-year training plan. This helps companies ensure they will reach ROI on their training investments, while giving schools a clear foundation for long-term planning. Curricula need updating every three or four years, or whenever an industry development necessitates change.

Part of the curriculum is the exam(s) that measure whether participants have mastered the validated competencies. Competence-based exams are key because they are the main quality assurance mechanism. If a school's or a company's participants are regularly failing on the competencies allocated to the school or company, they face consequences. Companies may lose the right to train if their apprentices regularly fail. When developing the curriculum, also consider exams: when and where should exams take place, what should they assess, and how should they work?

Example: VET Curriculum Design in Switzerland

The curriculum design process follows a specific formula for all occupations to ensure quality, relevance, and industry leadership.

1. Industry bodies, along with their member companies, agree upon specific **work cases** that trained individuals should be able to carry out. Each occupation comprises about 30 of these work cases.

   For example, an IT Service Desk employee receives and resolves an individual's technical problem which covers a number of specified issues (hard- and/or software-related) that have to be solved.

2. Each work case is broken down into specific **tasks and skillsets**.

   For example, the employee takes a call from a person having a problem, opens a ticket, resolves the issue by walking the customer through a number of adequate steps, or – if not resolvable - passes it up to the appropriate special department or superior, closes the ticket, and follows up with the person having the problem.

3. Curriculum experts break the tasks down into **competencies.**

   For example, taking the call requires appropriate language skills, workplace communication skills, IT knowledge of operating systems and network issues, procedural knowledge to identify next steps, and phone etiquette.

4. Competencies are allocated to cognitive levels, learning locations, and the appropriate timing within the program.

   For example, participants learn language skills in school throughout the apprenticeship, theoretical IT content in school in years one and two, phone etiquette at work in year one, and procedural knowledge at work throughout the apprenticeship.

5. All parties review and agree upon the final curriculum and design appropriate training plans to meet its requirements.

Systems Communication

Part of developing a system that integrates so many diverse stakeholders is creating a communication strategy. The key features of communication are sharing the quality of the new programs and the system, and developing a common language.

When the program is integrated into a single VET curriculum and as the permeable education system becomes concrete, all stakeholders need to know. Relatively new concepts like VET, occupations, and PET rely on common understanding for their value. They also present risks if not used consistently: for example, a company that starts marketing a summer internship as an apprenticeship puts the value of "real

apprenticeships that follow a 3-4 year dual curriculum" in question. Formal certifications and programs can be legally protected from this kind of confusion, but they need short-term protection immediately.

Marketing VET and the system helps stakeholders understand it while recruiting new participants and employers. The voices of participating apprentices, leaders from training companies, and statewide champions are a powerful resource for building interest and excitement for this initiative. Colorado VET is filling a desperate need, so word of mouth should be one of its most important tools. As research and data emerge, share results. Put on events to celebrate even the smallest victories and acknowledge hard work.

In such an interconnected system that involves so many diverse stakeholders, institutional dialogue is a necessity. One strategy for this working group to consider is establishing annual events for actors in similar roles but different companies, locations, industries, or jurisdictions. When school counselors, in-company training leaders, or district-level VET administrators can communicate with one another, they can share experiences and improve efficiency and effectiveness.

Example: Overcoming doubts about VET in healthcare

Businesses often have doubts about taking on apprentices for the first time, and the healthcare industry is especially risk averse. When Switzerland's constitutional reform in 1999 mandated that healthcare move from the purview of the Red Cross into that of the permeable education system, healthcare providers had major concerns about youth entering their workplaces. In a three-year period of negotiations and program development, reform implementers eventually reached a compromise using the apprenticeship curriculum.

The Healthcare Worker occupation is the first phase of a nursing pathway, starting with a VET program before participants specialize in a specific type of nursing. Healthcare Workers start their rotation in the workplace with simple and non-sensitive tasks like helping patients with meals, taking blood pressure, and more. As participants age and the apprenticeship develops, so do their skillsets and the tasks they carry out. When a participant starts taking on more delicate tasks as laid out in the curriculum, he or she is older and more prepared. The model is popular with healthcare employers as well as participants: within ten years of the reform's completion, the healthcare pathway is the third most popular occupation in Switzerland.

Other sensitive industries use similar approaches, using the VET curriculum to increase participants' responsibilities over time. The pharmaceutical industry is a good example of such a high-risk industry. However, most industries including banking and advanced manufacturing find that young people are more than capable of jumping straight into most tasks of the workplace at age 15 or 16. Even in those industries and occupations, apprentices wait for the most advanced, sensitive, or confidential tasks until they are older.

Colorado Expansion and Supporting Other States

Statewide expansion is the first priority. This initiative is Colorado-based and must succeed here before it makes sense to look anywhere else. However, one working group can look ahead to the already-raging interest from other states and make sure processes and tools are documented and developed so they can be adapted by other states in the future. This working group should have a strategic role of planning for cooperation, and an operational role carrying out specific preparatory tasks.

Planning for expansion is mostly about building expansion potential into the Colorado model. Tools and processes need to be adjustable for new contexts and different institutional frameworks. Most of the research projects that guide decision-making in Colorado need to be repeated in new states, since their legal and institutional frameworks are not the same. However, operational-level processes are more likely to be usable in new places. The working group needs to identify the most efficient approach for new tools: flexibility, re-creation, or adaptability.

Another part of the strategic approach to expansion is the initiative's funding approach. Building tools to be shared is more resource-intensive than building them just to work in Colorado. With this kind of planning, the initiative also moves from a local benefit to potential larger impact, which might attract a different type and amount of funding. The working group can plan out a funding approach that takes these differences into account. The funding approach should be output-oriented rather than input-oriented, meaning a lump-sum approach rather than a line-by-line accounting approach. That is how the best permeable education systems are funded[23], and it makes sense for this initiative.

This working group can identify potential risks associated with leaving Colorado, and develop strategies to mitigate them. The biggest is that the initiative in Colorado struggles because of overstretching to support other states. The Colorado initiative must always be the priority, because if it does not work no other state can. New states should have different leaders, stakeholders, individual actors, timelines, and priorities. The working group needs to identify what is negotiable and what is not. This may involve research projects in Colorado and in the potential new states. Finally, new projects associated with Colorado's dual VET need to be of equally high quality to protect the value of Colorado's permeable education system.

Most of the operational steps are already in progress under CareerWise Colorado's strategic leadership. The working group—which itself should involve CareerWise Colorado—is a good way to include other stakeholders' voices and experiences. Every state should be different, but they need to reach a common understanding of critical items before they can begin. Build a readiness pathway and establish clear roles and responsibilities for what Colorado can contribute and what the states need to have available before they can begin.

Every initiative needs to be locally driven, owned by its stakeholders, and clearly beneficial. Some stakeholders—usually business leaders—may need some communication to understand their roles and the potential benefits, but new projects need to join because they want to.

Recommendation 3b

Develop a readiness framework for interested partner states. For example:

1. Commit specified resources to the initiative, preserving Colorado staff and resources
2. Identify a strategic and operational leadership team led by industry and including key stakeholder groups from education, higher education, labor, and state leadership.
3. Develop a specific state vision and operational plan
4. Present the vision and plan to state leaders and stakeholders at home, get leadership and industry buy-in
5. Then begin initiative with Colorado support

3. CareerWise Colorado's Role

CareerWise Colorado is the operational leader of the current implementation initiative, and should become the system's facilitating intermediary. The two roles already overlap, with expansion inside Colorado as already-participating regions and stakeholders need operational support. Part of operational leadership is planning and risk management. Table 2 summarizes major potential issues and strategies for pre-empting or addressing them.

Table 2: Likely risks and strategies to address them

Risk	Strategy
Lack of clear critical path creates a cycle of reaction loops	Master plan Share critical path with main stakeholders
Staff turnover after 3-4 years	Capacity building Knowledge database, documentation
Lack of financial resources	Ongoing proactive fundraising Partner coordination
Staff and stakeholder fatigue after 2-3 years	Celebrate every small success, spotlight pioneers Esteem from meaningful figures
Negative media coverage	Create and maintain a high-level group of well-informed allies
Rocky starts to new and pilot projects	Build troubleshooting capacity (in advance)
Active opposition	Embrace opponents, use their ideas to improve Organize events together to foster dialectical communication
Unsustainable progress	Create a legal framework

Change over Time

CareerWise Colorado's role should change over time as the initiative matures, following the Master Plan as it engages more stakeholders. CareerWise Colorado should always have a role as system leader and facilitating intermediary, and must protect the Colorado initiative as other states begin their own.

In Colorado, CareerWise Colorado is the initiator, supporter, and key operational actor. It recruits other actors and helps them build capacity to fulfill their roles in the permeable education system. During the next phase, CareerWise Colorado can build structures then hand them off to other stakeholders. The medium term is about facilitating and convening stakeholders whenever possible, and shifting from design and piloting to legislation and system capacity like career guidance, monitoring and evaluation, and expanding or updating occupational curricula. In the long term, CareerWise Colorado should still intermediate among stakeholders, and can act as an innovation incubator for new pilots and programs.

If other states are interested, CareerWise Colorado should use separate resources for support. Other states' interest could become a risk, taking away time, energy, and resources from the work in Colorado. There is still a lot of work in Colorado, and the initiative is in a critical moment. Other states' interest is inevitable and positive, but has to come with resources and energy to protect the Colorado initiative from harm.

Recommendation 4

CareerWise Colorado must prioritize Colorado as it begins working with other states. The Colorado initiative is the leader and the proof of concept. When helping other states, keep Colorado staff and funding reserved for the Colorado initiative.

Final Thoughts

A permeable education system with valuable programs and industry partnership is feasible in Colorado and its formation is already underway. The Colorado VET pilot is the most radical change, and it is already being made successfully. Apprentices, companies, and schools are seeing success, fulfillment, and even financial returns in the program's early stages. Surrounding VET with a system that supports every program, enables diverse and changing pathways, and provides opportunities for all Coloradoans is the logical next step.

In Colorado, this initiative can shift from getting the first pilot off the ground to making a system that enables every young person to succeed and every adult to continue advancing throughout his or her lifetime. That means a permeable system with access to multiple programs or pathways and opportunities to pursue training as well as education. Every program should have value, based on high quality and currency in future education and training as well as the labor market. Finally, industry should move from consumers of education and skills to co-producers of the knowledge and skills to drive the Colorado economy. This part of the initiative is broad and multifaceted, so it requires a comprehensive master plan to structure operations.

If other states wish to follow in Colorado's footsteps, leadership, strategic planning, and design early on should help them succeed. Colorado may prove to be the pilot state for a change that gives American young people the access, opportunities, quality, value, and relevance they need to start successful lives.

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